

# Using text messages to support recovering substance misusers

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## ABSTRACT

**Background:** The use of digital technology in health and social care is developing rapidly. It is promoted in UK policy and research which suggests varied results surrounding its implementation and outcomes. **Introduction:** This article aimed to test the implementation and outcomes of a short messaging service sent to a dedicated phone. The target cohort were drug treatment clients in two sites in Northern England. **Materials and methods:** Through staff focus groups and interviews with a small cohort of clients, the implementation and perceptions of the system were examined. **Results:** A total of 19 participants were recruited to site 1 (15 male, 4 female, average age=37.7 years) and 12 participants were recruited to site 2 (9 male, 3 female, average age=40.3 years). One outcome that was of interest was wellbeing in treatment which, in this study, was described as an overall sense of feeling better rather than just focusing on the rehabilitation aspect of the programme. Other outcomes included: the successful completion of treatment and for clients to report and instance of a relapse/re-presentation. **Discussion:** The system shows some evidence of its 'social actor' role; however, its implementation was hindered by staff citing that it called for increased resources. For future implementation, the use of clients' own phones may be considered which may help to embed the system more fully in recovery planning and targeting clients at a different treatment stage. **Conclusions:** Despite some indications of positive results for clients and a perception that the system may have value as an addition to existing clinical interventions, more evaluation is required to determine whether this system can be implemented in a drug treatment setting.

**Key Words:** Digital technology ■ Health ■ Mobile phone ■ Recovery ■ Substance misuse

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The role of digital technology in health and social care delivery is growing. In its Five Year Forward View, NHS England suggests that this is a goal for care provision, stating 'An expanding set of NHS accredited health apps that patients will be able to use to organise and manage their own health and care; and the development of partnerships with the voluntary sector and industry to support digital inclusion' (NHS England, 2015). In

particular, the potential for digital technology to provide innovative methods of engagement that might otherwise require greater amounts of time, effort and financial resource is of interest (Botsis and Hartvigsen, 2008; Ritterband et al, 2009).

Technology can play a 'social actor' role, mimicking the attributes of human interaction and serve as a persuader (Cugelman et al, 2009). For example, in providing feedback or guidelines that support a user through an

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intervention process. Feedback can be as an important form of reinforcement in health interventions (Ritterband et al, 2009; Kypri et al, 2014). Critical to the success of this is the ability to personalise and tailor content to an individual's needs (Weitzel et al, 2007; Bewick et al, 2008; Kypri et al, 2014). The use of digital technology to provide, extend and reinforce substance use treatment has been identified in several cohorts including cannabis-smoking young people (Shrier et al, 2014), alcohol-using college students (Weitzel et al, 2007) and tobacco smokers looking to quit in the UK, New Zealand and Norway (Rodgers et al, 2005; Fjeldsoe et al, 2009; Whittaker et al, 2009), although research has not always indicated behaviour change as an outcome (Leu et al, 2005; Franklin et al, 2006).

A system has been developed by D2 Digital by Design, which aimed to use digital technology to reduce relapse among a population of alcohol misusers who had successfully achieved their treatment aims. The basic design of the intervention was a web-based system where clients' details were entered. Key workers and clients worked together to populate the system with questions and supportive responses that aimed to be unique to each client.

An evaluation of the digital technology in an alcohol treatment service has been undertaken. However, this evaluation did not involve a matched comparison group; therefore, it could not fully account for differences in outcomes between clients who took part in the intervention and those who had refused or were not suitable (D2 Digital by Design, 2015).

To further test the intervention, it was implemented in two drug treatment services in northern England (site 1 and site 2).

Ethical approval for the study and amendment was granted by the NRES Committee East of England – Norfolk in December 2013 and sites began to recruit participants in February 2014.

## Materials and methods

### Methodology

The study aimed to assess the acceptability and implementation of the system in two drug

treatment sites through the views of staff, clients and system usage data (e.g. text messages sent between the client and key worker, the number of text messages sent, and the time texts were sent/received).

## Recruitment

### Site 1

All participants were recruited from a single service location 12–24 weeks into their treatment.

### Site 2

Four service locations were used to recruit participants approximately 12 weeks before discharge (as determined by the key workers).

## Inclusion criteria

- Clients who had the ability to provide informed consent
- Clients who were willing to participate in the study
- Aged 18 and over.

## Exclusion criteria

- Primary alcohol clients e.g. those clients where alcohol is their first drug of choice (although it is worth noting that they may use others)
- Clients who had communication or language barriers that meant they could not formulate or respond to messages in the system
- Clients with severe and enduring mental health conditions rendering their engagement in the project unsafe or unrealistic (as judged by the key workers)
- Clients who lost the phone during the study
- Clients who went to prison during the study
- Clients who intentionally moved to another area while engaged in the study, including clients entering residential rehabilitation.

## Intervention

The intervention was a web-based system where client's details were entered. The sites were provided with a list of previously used questions (D2 Digital by Design, 2015). These questions were adapted to form messages that were entered onto the system. On a daily basis, or as regularly as determined by key workers in consultation with clients, the system

randomly selected a question which was sent to participants who could respond and reflect their feelings (1: doing well, 2: need of some additional support, 3: need of immediate support). This response determined whether a basic, supportive message was returned (e.g. well done, keep going), a personalised message that the client constructed with their key worker (e.g. remember you said you would do some gardening when you felt stressed) or whether a phone call was immediately received from their key worker. All key workers and administrators had access to the system to ensure that level 3 responses were acted on as quickly as possible. Participants were invited to a meeting with their key worker to outline (verbally and in writing) how the system worked and to construct bespoke support messages. They were provided with a mobile phone that could only interact with the system, given a brief session on its use, and signed a user agreement.

### Site 1

Participants at site 1 could use the system for 12 months or until they left treatment (if before 12 months). During their time with the intervention, the intention was that participants would have regular sessions with their key worker to review the questions and support messages to ensure that they were still relevant.

### Site 2

Participants at site 2 could use the system for the remainder of their time in treatment (approximately 12 weeks) and 6 months post structured treatment discharge.

## Qualitative data collection

Service user representatives (a group of ex or current service users who act as ambassadors) were involved in the construction of bespoke qualitative interview and focus group schedules. The interviews were designed to explore perceptions of the system, ease of use, perceived impact on recovery, barriers and suggested improvements.

### Clients

Sites used the same interview schedule.

“The potential of digital technology for healthcare lies in its ability to make more efficient use of resources”

Interviews covered clients' perceptions of the usefulness of the system, positive and negative aspects of being involved in the pilot and perceptions of the impact of the messages on their recovery. There was no sampling strategy used for this element of the work. All of the clients who were given a mobile phone for the intervention were offered the opportunity to participate in an interview once they reached 3–8 months engagement. Key workers supported the arrangement of these interviews which were undertaken face-to-face where possible (or on the telephone if clients had left the service, or a suitable time could not be arranged).

### Staff

Every staff member who had been involved with the pilot were invited to participate in focus groups to examine the implementation, usefulness and efficacy of the intervention from a staff perspective. Focus groups took place at their place of work and were completed between 12–15 months into the pilot.

## Qualitative data analysis

Qualitative data from face-to-face, telephone and focus group interviews were analysed using Burnard's (1991) six stage analysis technique to identify codes, categories and themes. NVIVO (version 10) software was used to assist the process of data analysis for the purposes of this study.

## System usage information

Data relating to system usage was analysed including: how many members of staff used the system, personalisation of the prompts and responses, client responses to prompts, and service action against level 3 responses.

The final prompt questions and personalised messages used by each site were extracted and examined.

## Results

On the whole, staff and clients reported the system to be easy to use; however, average response rates to prompt questions remained low throughout the study (site 1=19%, site 2=31%).

In addition, there was no personalisation of basic messages and variable, limited personalisation of more supportive responses. In a small number of cases in each site (Site 1=5, Site 2=1) no personalised responses were added to the system.

The importance of personalisation was highlighted by clients both in complaining about receiving duplicate messages and praising personal relevance and adjustable timing of messages. The perceived time taken to populate the system with personalised responses was a substantial barrier to successful implementation with this process not incorporated into recovery planning.

On the contrary, staff wanted more control over which messages were sent out rather than the random pattern selected by the system. Longer engagement with the system would have been required to establish this pattern. Among the small numbers of clients interviewed, and to a slightly lesser degree the staff, the intervention was felt to have potential benefits. Clients highlighted the concept of someone being there as important. In a small number of cases, a lapse was reported as being prevented due to the system prompts.

### Site 1 Participants

In total, 19 participants were recruited and

provided with a phone (15 male, 4 female, average age=37.7 years). Eight participants left the study as they had either dropped out of treatment or went to prison.

### System usage

Of the 19 clients who were registered on the system 14 responded to at least one message sent from the system. Overall the response rate to questions sent out was 19%, with participant response rates ranging from 0–54%. The total number of messages sent to clients ranged from 38–334, although this is influenced by the length of time engaged with the pilot.

### Staff and client perceptions Staff

Focus groups and individual interviews were undertaken with 14 members of staff (2 focus groups and 5 individual interviews). Of the 13 key workers who participated in the focus groups, 6 worked with clients who were not eligible to participate in the study. Five key workers had recruited clients to the pilot and used the system, and two had consented clients to participate in the pilot but were unable to do so as the clients had either become disinterested, were homeless, had mental health issues, were in and out of treatment or had gone to prison.

### Clients

Of the 19 participants who were recruited to this pilot study and were allocated a phone, individual semi-structured interviews were conducted with 5 of the clients. Three of these interviews were over the phone and two were face-to-face. The clients who were interviewed had used the phone for varying lengths of time (between 1–6 months). The remaining 14 clients were not interviewed because of their life circumstances e.g. they became disinterested, were homeless, had mental health issues, were in and out of treatment or had gone to prison.

### Client engagement

Key workers felt there was a general lack of engagement from clients in the study. This included clients who had become disinterested, were homeless, had mental health issues, were

“ Staff wanted more control over which messages were sent out rather than the random pattern selected by the system ”

in and out of treatment or had gone to prison. The more 'chaotic' nature of clients early in treatment was highlighted as a study limitation.

## Site 2 Participants

In total 12 participants were recruited (9 male, 3 female, average age=40.3 years); however, 1 participant was never provided with a phone due to an oversight in the study and 1 participant took a phone and returned it almost immediately. A further three participants left the study and returned the phone before the end of their expected engagement period. Three of the remaining clients had periods during which they were without a functioning phone due to issues with charging the device because they were homeless or lost the phone.

## System use

Of the 10 clients who were registered on the system 9 responded to at least one message sent from the system. Overall the response rate to questions sent out was 33% with per participant response rates ranging from 0–85%. The total number of messages sent ranged from 16–227 and was influenced by the length of time that participants engaged with the pilot.

## Staff and client perceptions Staff

Three focus groups were undertaken with two, nine and 3 staff respectively at the two sites. All staff had experience of supporting either clients or key workers involved in this study.

## Client interviews

Of the 10 individuals who were recruited to the study, three were interviewed (two face-to-face and one via the telephone).

## Discussion and conclusion

The potential of digital technology for healthcare lies in its ability to make efficient use of resources (Botsis and Hartvigsen, 2008; Ritterband et al, 2009). The increase in mobile apps has drawn attention to several recurring issues influencing their acceptance and adoption by end users. Examples of such issues include

variability in quality of apps with inadequate regulatory systems (Marley and Farooq, 2015), limited involvement of health professionals and service users (Sagar and Pattanayak, 2015), and lack of integration with behaviour change theory (Direito et al, 2014; Klein et al, 2014; Lyzwinski, 2014; Middelweerd et al, 2014).

## Study limitations

In this study, staff in both sites did not see the modified mobile phone, that was being used for the intervention, as a benefit that was being realised and found the system's requirements onerous and disruptive in the short term (National Information Board, 2014). This is common in the adoption of digital healthcare interventions (Johnson et al, 2001; Brailer et al, 2003; Finch et al, 2003; Yarbrough et al, 2007; Jimison et al, 2008; The King's Fund, 2008; MacNeill et al, 2014), with even effective interventions rejected if they are determined to require more resources than standard practice. Factors such as perceived effectiveness of the system, momentum generated through system use and monitoring of system use expectations, shown to be critical in successfully implementing innovative information technology systems in healthcare were also absent (Kukafka et al, 2003; Leatt et al, 2006).

Feedback from the small number of clients interviewed did suggest that the technology has the potential to effectively play the 'social actor' role, but definite conclusions about this could not be drawn as the critical element of personalisation was so often missing (Bewick et al, 2008; Weitzel, 2007; Kypri et al, 2014).

The intervention is not yet ready for the assessment of effectiveness through a trial in this setting and further work on its implementation needs to be undertaken. Any future implementation should consider not using a separate handset and should consider whether a cohort of clients neither at the very start or very end of treatment should be targeted. [BJHCM](#)

## References

Bewick BM, Trusler K, Barkham M et al. The effectiveness of web-based interventions designed to decrease alcohol consumption - a systematic review. *Prev Med.* 2008;47(1):17–26. <https://doi.org/10.1016/j.pmed.2008.04.002>



- ypmed.2008.01.005
- Botsis T, Hartvigsen G. Current status and future perspectives in telecare for elderly people suffering from chronic diseases. *J Telemed Telecare*. 2008;14:195–203. <https://doi.org/10.1258/jtt.2008.070905>
- Brailer DJ, Terasawa EL. 2003. Use and adoption of computer-based patient records. <https://www.chcf.org/publication/use-and-adoption-of-computer-based-patient-records/> (accessed 13 August 2018)
- Burnard PB. A method of analysing interview transcripts in qualitative research. *Nurs Educ Today*. 1991;11(6):461–466. [https://doi.org/10.1016/0260-6917\(91\)90009-Y](https://doi.org/10.1016/0260-6917(91)90009-Y)
- Cugelman B, Thelwall M, Dawes P. Communication-based influence components model. 2009. <https://doi.org/10.1145/1541948.1541972>
- Direito A, Dale L, Shields E et al. Do physical activity and dietary smartphone applications incorporate evidence-based behaviour change techniques? *BMC Public Health*. 2014;14:646. <https://doi.org/10.1186/1471-2458-14-646>
- D2 Digital by Design. 2015. The Bolton SHINE Alcohol Relapse Prevention Project: one year on. <http://www.digitalbehaviourchange.co.uk/project/shine-in-bolton-with-the-health-foundation>
- Fjeldsoe BS, Marshall AL, Miller YD. Behavior change interventions delivered by mobile telephone short-message service. *Am J Prev Med*. 2009;36(2):165–173. <https://doi.org/10.1016/j.amepre.2008.09.040>
- Finch TL, May CR, Mair FS et al. Integrating service development with evaluation in telehealthcare: an ethnographic study. *BMJ*. 2003;327(7425):1205–1209. <https://doi.org/10.1016/j.amepre.2008.09.040>
- Franklin VL, Waller A, Pagliari C et al. A randomized controlled trial of Sweet Talk, a text-messaging system to support young people with diabetes. *Diabet Med*. 2006;23(12):1332–1338. <https://doi.org/10.1111/j.1464-5491.2006.01989.x>
- Jimison H, Gorman P, Woods S et al. Barriers and drivers of health information technology use for the elderly, chronically ill and underserved. *Evid Rep Technol Assess*. 2008;175:1–1422.
- Johnson KB. Barriers that impede the adoption of paediatric information technology. *Arch Pediatr Adolesc Med*. 2001;155(12):1374–1379. <https://doi.org/10.1001/archpedi.155.12.1374>
- Klein M, Mogles N, van Wissen A. Intelligent mobile support for therapy adherence and behaviour change. *J Biomed Inform*. 2014;51:137–151. <https://doi.org/10.1016/j.jbi.2014.05.005>
- Kukafka R, Johnson SB, Linfante A et al. Grounding a new information technology implementation framework in behavioral science: a systematic analysis of the literature on IT use. *J Biomed Inform*. 2003;36:218–227.
- Kypri K, Vater T, Bowe SJ et al. Web-based alcohol screening and brief intervention for university students: a randomized trial. *JAMA*. 2014;311(12):1218–1224. <https://doi.org/10.1001/jama.2014.2138>
- Leatt P, Shea C, Studer M et al. IT Solutions for Patient Safety – Best Practices for Successful Implementation in Healthcare. *Electronic Healthcare*. 2006;4(3):94–104.
- Leu MG, Norris TE, Hummel J et al. A randomized, controlled trial of an automated wireless messaging system for diabetes. *Diabetes Technol Ther*. 2005;7(5):710–720. <https://doi.org/10.1089/dia.2005.7.710>
- Lyzwinski L. A systematic review and meta-analysis of mobile devices and weight loss with an intervention content analysis. *Journal of Personalized Medicine*. 2014;4:311–385. <https://doi.org/10.3390%2Fjpm4030311>
- MacNeill V, Sanders C, Fitzpatrick R et al. Experiences of front-line health professionals in the delivery of telehealth: a qualitative study. *Brit J Gen Pract*. 2014;64(624):401–407. <https://doi.org/10.3399/bjgp14X680485>
- Marley J and Farooq S. Mobile telephone apps in mental health practice: uses, opportunities and challenges. *B J Psych Bulletin*. 2015;39(6):288–290. <https://doi.org/10.1192%2Fbp.b.114.050005>
- Middelweerd A, Mollee J, Van Der Wal N et al. Apps to promote physical activity among adults: a review and content analysis. *International Journal of Behavioural Nutrition and Physical Activity*. 2014;11:97. <https://doi.org/10.1186/s12966-014-0097-9>
- National Information Board. Personalised health and care 2020 using data and technology to transform outcomes for patients and citizens: a framework for action. HM Government; London: 2014.
- NHS England. 2015. Five Year Forward View. London: NHS England. <http://www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf> (accessed 9 July 2018)
- Ritterband LM, Thorndike FP, Cox DJ et al. A behaviour change model for internet interventions. *Ann Behav Med*. 2009;38:18–27. <https://doi.org/10.1007/s12160-009-9133-4>
- Rodgers A, Corbett T, Bramley D et al. Do u smoke after txt? Results of a randomised trial of smoking cessation using mobile phone text messaging. *Tob Control*. 2005;14:255–261. <https://doi.org/10.1136/tc.2005.011577>
- Sagar R and Pattanayak R. Use of smartphone apps for mental health: Can they translate to a smart and effective mental health care? *J Ment Health*. 2015;20(1):1–3. <https://doi.org/10.4103/0971-8990.164791>
- Shrier LA, Rhoads AM, Fredette ME et al. “Counselor in your pocket”: youth and provider perspectives on a mobile motivational intervention for marijuana use. *Subst Use Misuse*. 2014;49(1-2):134–144. <https://doi.org/10.3109/10826084.2013.824470>
- The King's Fund. 2008. Technology in the NHS Transforming the patient's experience of care. [http://www.kingsfund.org.uk/sites/files/kf/Technology-in-the-NHS-Transforming-patients-experience-of-care-Liddell-Adshead-and-Burgess-Kings-Fund-October-2008\\_0.pdf](http://www.kingsfund.org.uk/sites/files/kf/Technology-in-the-NHS-Transforming-patients-experience-of-care-Liddell-Adshead-and-Burgess-Kings-Fund-October-2008_0.pdf) (accessed 9 July 2018)
- Weitzel JA, Bernhardt JM, Usdan S et al. Using wireless handheld computers and tailored text messaging to reduce negative consequences of drinking alcohol. *J Stud Alcohol Drugs*. 2007;68(4):534–537.
- Whittaker R, Borland R, Bullen C et al. Mobile phone-based interventions for smoking cessation. *Cochrane Database of Systematic Reviews*. 2009; Issue 4. <https://doi.org/10.1002/14651858.CD006611.pub4>
- Yarbrough AK, Smith TB. Technology acceptance among physicians: a new take on TAM. *Med Care Res Rev*. 2007;64:650–72. <https://doi.org/10.1177/1077558707305942>

**Appendix 1. Client and staff perceptions**

Theme	Content	Site
General system perceptions	<p>Opinions of key workers varied about the type of phone that clients would most engage with. While some felt that the simplicity of the phone was a good thing as it would not encourage people to steal it or sell it, others raised the issue of how the phone would look among the clients' peers and suggested that a more 'flashy' or smart phone be used, which would also enable clients to use it as part of their day-to-day lives.</p> <p>'You'd be surprised, the issue around image. You pull an old Nokia brick phone out and people are gonna laugh at you. I know it's not meant for that, but if you give people access to a phone that is more usable, in their day to day life, they are more likely to respond to messages'</p> <p>Many key workers highlighted the association between mobile phones and contacting drug dealers. Some clients refused to take part so that they would not have to explain to family and friends why they had an additional mobile phone.</p> <p>'All they need their phone for is to score...to phone their dealer, that's all they would need that phone for, and they can't use it for that, so...'</p>	1 [Key worker]
Personalised text messages	<p>All of the key workers who used the system commented on the time-consuming nature of constructing and inputting personalised messages and responses. Some key workers felt there were too many messages to manage and that this process may have become unmanageable if they had many clients taking part in the pilot. Also, they experienced some difficulty in adapting questions used in other sites for use with their clients. Often clients were felt to be too early in their treatment to concentrate fully on constructing messages.</p> <p>'It was time consuming. And quite a struggle actually. To think of that many questions to fit within the categories, yes and no answers. It was quite... time consuming.'</p>	1 [Key worker]
Impact of Intervention	<p>Although key workers enjoyed some of the features of using the mobile phone system, they did not feel that the intervention had a significant impact on their clients' behaviour or their therapeutic relationship. Primarily this was down to a feeling that clients were too early in treatment to fully engage.</p> <p>'I don't think it's working with the clients I've got, it's not made any difference. Not motivated them, hasn't done anything to tell you the truth...because they are both still chaotic.'</p>	1 [Key worker]
	<p>In contrast, clients found that text messages motivated them to reflect on their trigger points, alter behaviour to avoid using and tackled feelings of isolation. In some cases, messages coincided with the desire to use and recommended activities that were specific to them so they felt personal.</p> <p>'When I've had text messages saying things like 'have you spoken with your social worker?' and was having psychotic problems, I was like, yeah, I'm gonna speak to her... I was tempted to go out and try and score but I was getting my text messages.'</p>	1 [Client 5]
	<p>Clients found the additional contact that the phone represented helpful. They felt reassured in the knowledge that there was a 'person' in contact with them who cared, understood drug-related issues and was available especially during difficult personal situations.</p> <p>'Yes, it actually makes you feel that someone cares even though they are automated questions.'</p>	2 [Client 1]